

1.0 SCOPE

This specification covers the detail requirements for a dual general-purpose operational amplifier.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace spec control drawings.

1.2 Part Number. The complete part numbers per Table I of this specification follow:

<u>Device</u>	<u>Part Number</u>	<u>Package</u>
A	OP-14AJ/883	J
X	OP-14J/883	J
A	OP-14AZ/883	Z
X	OP-14Z/883	Z

1.2.3 Case Outline.

<u>Letter</u>	<u>Case Outline (Lead finish per MIL-M-38510)</u>
J	8-lead metal can (TO-99)
Z	8-lead hermetic dual-in-line package (CERDIP)

1.3 Absolute Maximum Ratings. ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Supply Voltage.....	$\pm 22\text{V}$
Power Dissipation	500mW
Differential Input Voltage.....	$\pm 30\text{V}$
Input Voltage	Supply Voltage
Output Short-Circuit Duration	Indefinite
Operating Temperature Range	-55°C to $+125^\circ\text{C}$
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Lead Temperature (Soldering, 60 sec).....	$+300^\circ\text{C}$

1.5 Thermal Characteristics:

Thermal Resistance, TO-99 (J) package:

Junction-to-Case (θ_{JC}) = 45°C/W MAX

Junction-to-Ambient (θ_{JA}) = 150°C/W MAX

Thermal Resistance, CERDIP (Z) package:

Junction-to-Case (θ_{JC}) = 26°C/W MAX

Junction-to-Ambient (θ_{JA}) = 119°C/W MAX

TABLE 1

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

OP-14/883							
Characteristics	Symbol	Special Conditions	LIMITS A		LIMITS X		Units
			Min	Max	Min	Max	
Input Offset Voltage	V _{OS}	R _S ≤ 20kΩ -55°C ≤ T _A ≤ +125°C	—	0.75 1.5	—	2.0 3.0	mV mV
Input Offset Current	I _{OS}	-55°C ≤ T _A ≤ +125°C	— —	5 10	— —	5 10	nA nA
Input Bias Current	I _B	-55°C ≤ T _A ≤ +125°C	— —	±50 ±60	— —	±75 ±100	nA nA
Input Voltage Range (Note 1)	IVR	-55°C ≤ T _A ≤ +125°C	±10	—	±10	—	V
Common-Mode Rejection	CMR	V _{CM} = IVR = ±10V	85	—	80	—	dB
		R _S ≤ 20kΩ					
		V _{CM} = IVR = ±10V	80	—	80	—	dB
		R _S ≤ 20kΩ -55°C ≤ T _A ≤ +125°C					
Power Supply Rejection Ratio	PSRR	V _S = ±5V to ±20V R _S ≤ 20kΩ -55°C ≤ T _A ≤ +125°C	—	60	—	100	μV/V
Output Voltage Swing	V _O	R _L ≥ 2kΩ	±12	—	±12	—	V
		R _L ≥ 2kΩ	±12	—	±12	—	V
		-55°C ≤ T _A ≤ +125°C					
Large-Signal Voltage Gain	A _{VO}	V _O = ±10V, R _L ≥ 2kΩ	100	—	50	—	V/mV
		V _O = ±10V, R _L ≥ 2kΩ	50	—	25	—	V/mV
		-55°C ≤ T _A ≤ +125°C					
Supply Current (Each Amplifier)	I _{SY}	V _O = 0V	—	3	—	3	mA

TABLE 1 (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

OP-14/883							
Characteristics	Symbol	Special Conditions	LIMITS A		LIMITS X		Units
			Min	Max	Min	Max	
Power Dissipation (Each Amplifier)	P _d	V _O = 0V	--	90	--	90	mW
Channel Separation	CS		100	--	100	--	dB
Output Short- Circuit Current	I _{SC} ⁺		--	60	--	60	mA
	I _{SC} ⁻		-60	--	-60	--	mA
Input Resistance Differential Mode (Note 2)	R _{IN}		2.0	--	1.35	--	MΩ
Rise time	t _r	A _{VCL} = +1, V _{IN} = 50mV R _L ≥ 2kΩ, C _L = 50pF	--	350	--	350	ns
Overshoot	OS	A _{VCL} = +1, V _{IN} = 50mV R _L ≥ 2kΩ, C _L = 50pF	--	10	--	10	%
Slew Rate	SR	R _L = 2kΩ, C _L = 100pF	0.25	--	0.25	--	V/μs
Bandwidth (Note 3)	BW	A _{VCL} = +1	1	--	1	--	MHz
Large Signal Bandwidth (Note 4)	LSBW	V _O = 20Vp-p	4	--	4	--	kHz
Input Offset	ΔV _{OS}		--	1.0	--	2.0	mV
Voltage Match		-55°C ≤ T _A ≤ +125°C	--	1.5	--	3.0	mV
Common-Mode		V _{CM} = ±10V, R _S ≤ 100Ω	94	--	94	--	dB
Rejection Match	ΔCMR	V _{CM} = ±10V, R _S ≤ 100Ω -55°C ≤ T _A ≤ +125°C	90	--	90	--	dB

TABLE 1 (Continued)

$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = 25^\circ C$ unless otherwise specified.

OP-14/883							
Characteristics	Symbol	Special Conditions	LIMITS A		LIMITS X		Units
			Min	Max	Min	Max	
Average Input Offset Voltage Drift	TCV _{OS}	T _A = -55°C, +125°C	—	8.0	—	10.0	μV/°C
Average Input Offset Current Drift	TCI _{OS}	T _A = -55°C, +125°C	—	120	—	250	pA/°C

NOTES:

1. IVR is defined as the V_{CM} range used for the CMR test.
2. R_{IN} is derived from I_B by the relationship $R_{IN} = \frac{4kT}{qI_B}$, where $\frac{kT}{q} = 0.026V$ @ $+25^\circ C$
3. Bandwidth (BW) is derived from t_r by the relationship $BW = \frac{0.35}{t_r}$
4. LSBW is derived from SR by the relationship $LSBW = \frac{SR}{2\pi V_{peak}}$

TABLE 2

OP-14/883

**Electrical Test Requirements
For Class B Devices**

MIL-STD-883 Test Requirements	Subgroups (see Table 3)
Interim Electrical Parameters (pre Burn-In)	1
Final Electrical Test Parameters	1*, 2, 3, 4, 5, 6
Group A Test Requirements	1, 2, 3, 4, 5, 6, 7

- * PDA applies to Subgroup 1 only.
No other Subgroups are included in PDA.

TABLE 3
Group A Inspection
 $V_S = \pm 15V$; $R_S = 50n$; $T_A = T_J$ unless otherwise specified.

OP-14/883							
Subgroup	Symbol	Special Conditions	LIMITS A		LIMITS X		Units
			Min	Max	Min	Max	
Subgroup 1 T _A = +25 °C	V _{OS}	R _S = 50n, 20k Ω	--	0.75	--	2.0	mV
	I _{OS}		--	5	--	5	nA
	I _B		--	± 50	--	± 75	nA
	CMR	V _{CM} = $\pm 10V$; R _S = 50n, 20k Ω	85	--	80	--	dB
	PSRR	V _S = $\pm 5V$, $\pm 20V$ R _S = 50n, 20k Ω	--	60	--	100	$\mu V/V$
	P _d	V _O = 0V (Each Amplifier)	--	90	--	90	mW
	ΔV_{OS}		-1	1	-2	2	mV
	ΔCMR	V _{CM} = $\pm 10V$	94	--	94	--	dB
Subgroup 2 T _A = +125 °C	V _{OS}	R _S = 50n, 20k Ω	--	1.5	--	3.0	mV
	I _{OS}		--	10	--	10	nA
	I _B		--	± 60	--	± 100	nA
	CMR	V _{CM} = $\pm 10V$; R _S = 50n, 20k Ω	80	--	80	--	dB
	PSRR	V _S = $\pm 5V$, $\pm 20V$ R _S = 50n, 20k Ω	--	60	--	100	$\mu V/V$
	ΔV_{OS}		--	1.5	--	3.0	mV
	ΔCMR	V _{CM} = $\pm 10V$	90	--	90	--	dB
Subgroup 3 T _A = -55 °C	All Tests, Limits and Conditions are the same as for Subgroup 2.						

TABLE 3

Group A Inspection (Continued)

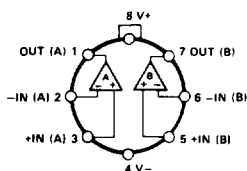
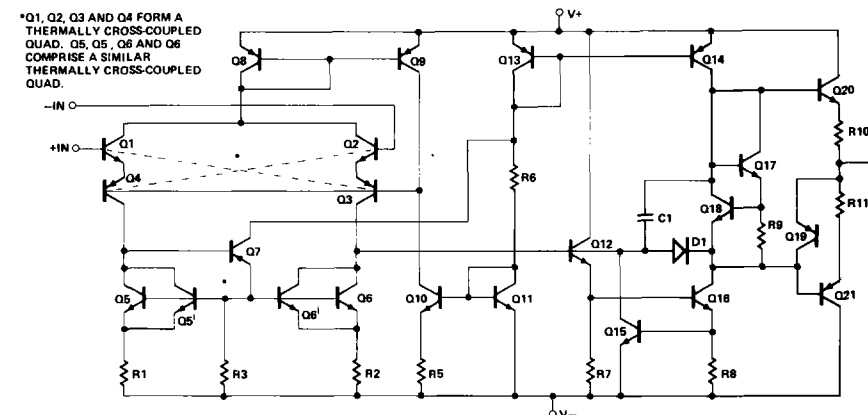
$V_S = \pm 15V$; $R_S = 50\Omega$; $T_A = T_J$ unless otherwise specified.

OP-14/883							
Subgroup	Symbol	Special Conditions	LIMITS A		LIMITS X		Units
			Min	Max	Min	Max	
Subgroup 4	V _O	R _L = 2k Ω	± 12	—	± 12	—	V
T _A = +25°C	A _{VO}	V _O = ± 10 V, R _L = 2k Ω	100	—	50	—	V/mV
	CS		100	—	100	—	dB
Subgroup 5	V _O	R _L = 2k Ω	± 12	—	± 12	—	V
T _A = +125°C	A _{VO}	V _O = ± 10 V, R _L = 2k Ω	50	—	25	—	V/mV
Subgroup 6	All Tests, Limits and Conditions are the same as for Subgroup 5.						
T _A = -55°C							
Subgroup 7	SR	C _L = 100pF, R _L = 2k Ω	0.25	—	0.25	-	V/ μ s
T _A = +25°C	t _r	A _{VCL} = +1, V _{IN} = 50mV C _L = 50pF, R _L = 2k Ω	—	350	—	350	ns
	OS	A _{VCL} = +1, V _{IN} = 50mV C _L = 50pF, R _L = 2k Ω	—	10	—	10	%

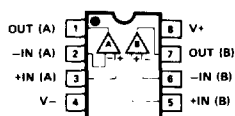
3.2.1 Simplified Schematic and Pin Connections.

(Each Amplifier)

*Q1, Q2, Q3 AND Q4 FORM A THERMALLY CROSS-COUPLED QUAD. Q5, Q5', Q6 AND Q6' COMPRISE A SIMILAR THERMALLY CROSS-COUPLED QUAD.



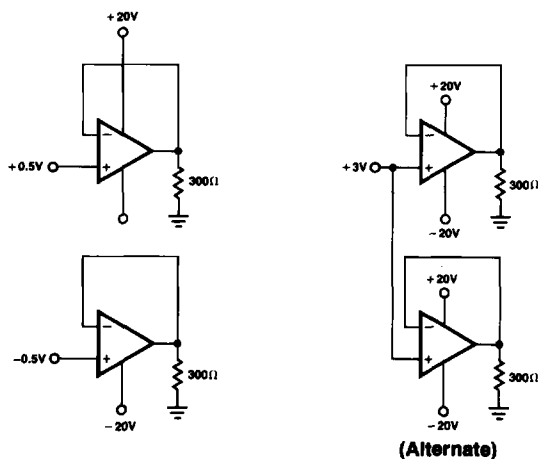
**TO-99
(J-Suffix)**



**8-PIN HERMETIC DIP
(Z-Suffix)**

3.2.4 Microcircuit Group Assignment. This microcircuit is covered by microcircuit group 49.

4.2 Life Test/Burn-In Circuit.



(Alternate)